AMENDMENTS TO THE DRAWINGS

The Office Action dated January 30, 2002, states that formal drawings must be filed within the three month shortened statutory period set for reply in the "Notice of Allowability" to avoid extension of time fees. The Office Action further states that corrections other than informalities noted by the Draftsperson must be approved by the Examiner before the application will be allowed.

In the Applicant's Amendment dated April 9, 2002, FIGS. 2, 4, and 7 were submitted with a sketch in red ink of the changes to be incorporated. The Applicant has no record of a response from the Patent Office with regard to the revised drawings. Therefore, Applicant respectfully requests that the Examiner advise the status of the FIGS. 2, 4, and 7.

REMARKS

Claims 1, 3-12 and 15-27 remain pending in the present application. It is respectfully submitted that the pending claims define allowable subject matter.

During the telephone interview with Examiner Choobin on April 3, 2003, independent claim 1 was discussed with regard to Ergun et al. (USP 6,298,109). No agreement was reached.

Claims 1, 3-12 and 15-27 were rejected under 35 U.S.C. § 102(e) as being anticipated by Ergun et al. (USP 6,298,109). Applicant respectfully traverses the outstanding rejection.

Claim 1 recites "dividing a digital medical image into at least two bands of predetermined width; determining whether the digital medical image within said at least two bands includes at least one non-clinical region; and calculating a dynamic range based on a clinical region within each of said at least two bands." Ergun's x-ray imaging system, however, "provides automatic adjustment of x-ray tube voltage and current as deduced from two exposures at different voltages. Real-time image distortion removal and image rotation are accomplished by computer processing using a generalized image transformation polynomial." (Abstract) The automatic adjustment of x-ray tube voltage and current are prior art, as discussed in Applicant's Background of the Invention, starting at page 2, line 4.

The Office Action states that "Ergun et al. disclose ... dividing a digital medical image into at least two bands of predetermined width (refer for example to Fig. 19)." (Page 3) The Office Action further includes a copy of Ergun's FIG. 19. However, FIG. 19 concerns image distortion as recited in the abstract, and the horizontal and vertical grid lines illustrated on FIG. 19 represent the grid 100, and fails to recite or suggest "dividing a digital medical image into at least two bands of predetermined width." Ergun states that:

> FIG. 19 is a schematic representation of a distorted image of FIG. 11 and a schematic representation of a corresponding undistorted image showing the variables used in the mathematical transformation of the distorted image to correct for rotation and distortion; [and] FIG. 20 is a flow chart of the steps performed by the electronic computer in correcting and transforming the image of FIGS. 11 and 19. (Col. 4, line 65 – Col. 5, line 2)

Thus, the left side image of FIG. 19 "is a schematic representation of a distorted image of FIG. 11" (Col. 4, lines 65-66, emphasis added) and therefore illustrates received image 86 which was imaged with the grid 100. The right side image of FIG. 19 is "a schematic representation of a corresponding undistorted image showing the variables used in the mathematical transformation of the distorted image to correct for rotation and distortion." (Col. 4, line 66 – Col. 5, line 2, emphasis added)

Ergun further clarifies that FIG. 19 concerns distortion, stating that "[r]eferring to FIG. 19, there are two types of distortion, isotropic and anisotropic." (Col. 9, lines 26-27) Ergun states that "[r]eferring also [to] FIG. 2, received image 86 may exhibit pin cushion distortion evident if an image 86 of the rectilinear grid 100 is made." (Col. 9, lines 41-42, emphasis added) Parameters required to identify the x and y pixel shifts due to distortion:

> may be automatically extracted by imaging the known grid 100 and comparing the distorted image of the grid 100 to the known grid 100 to deduce the degrees of distortion. Referring now to FIG. 19 in a first step of the correction process, the grid 100 is imaged as indicated by process block 160 [FIG. 20] to determine the exact type of distortion present and to obtain values for the coefficients a through p of the above referenced polynomial equations." (Col. 9, lines 57-65, emphasis added)

Therefore, Ergun is not "dividing a digital medical image into at least two bands of predetermined width" (as in claim 1) at the location referenced in the Office Action or anywhere else. Therefore, claim 1 is patentable.

Independent claim 11 recites "a segmentation module identifying clinical and non-clinical regions within a digital medical image, said non-clinical regions comprising at least a collimated region." The Office Action refers to column 16, lines 28-40 and FIG. 23 of Ergun. However, the FIG. 23 and text are concerned with identifying scatter radiation, which is an issue unrelated to Applicant's claim 11. FIG. 23 illustrates "a cross-sectional view through the occluder of an imaged object of FIG. 21 along line 23--23, aligned with a graph depicting attenuation of x-rays as a function distance along the line of cross-section as well as theoretical attenuation without scatter and scatter components." (Col. 5, lines 11-16) The occluder is defined by Ergun as "being

an x-ray transparent plate such as may be constructed of PLEXIGLAS and incorporating into its body, a plurality of x-ray blocking lead pins 216. Preferably these pins are placed so as to project images 218 onto the image 208 received by the image intensifier 206 in positions outside an image 220 of the spine 200." (Col. 15, line 67 – Col. 16, line 5)

The text of Ergun referred to in the Office Action is repeated below for clarity:

> The image 208 is then used to derive a scatter map. Referring to FIG. 23, generally the amount of scatter at a given point will be a function of how many x-ray photons are received at points adjacent to the given point. For example, comparing the image 208 to a theoretical scatterless image 228 generally in an attenuated region 230 of the image 208 (e.g., under the spine 200), scatter will increase the apparent value in the image 208 as a result of radiation from nearby low attenuation regions scattering into the high attenuation region 230. Conversely the apparent value at a low attenuation region 232 will be decreased because of the scatter into the high 5 attenuation region. (Col. 16, lines 28-40)

As previously discussed, Ergun is identifying scatter radiation, and states that "[b]ecause the scattered x-rays 212 do not carry information about the attenuation of the spine 200, they are desirably removed from the image 208 prior to its use in quantitative measurement." Thus, Ergun determines the amount of scatter radiation and subtracts it from the image data. Therefore, Ergun does not recite or suggest "identifying clinical and non-clinical regions within a digital medical image, said non-clinical regions comprising at least a collimated region" in this location or anywhere else.

Further addressing claim 11, Ergun does not recite or suggest identifying "non-clinical regions comprising at least a collimated region" anywhere else. Ergun only identifies unattenuated pixels, stating "it is necessary to eliminate consideration of the data from the CCD camera 84 that form pixels in the image corresponding to x-rays that bypass the imaged object and are unattenuated ("background pixels")." (Col. 11, lines 19-22) Furthermore, referring to FIG. 13 of Ergun, "the present invention identifies one peak, 124 in the histogram 122 as background pixels indicated by process block 120 in FIG. 14. In identifying this peak 124, the computer 22 examines the histogram 122 from the brightest pixels (rightmost) to the darkest pixels (leftmost) assuming that the brightest pixels are more likely to be the unattenuated

background pixels." (Col. 11, lines 44-50) "Once the peak 124 has been identified, the pixels associated with that peak are removed per process block 126 by thresholding or subtraction." (Col. 11, lines 53-55) Thus, Ergun is not concerned with a collimated region, and does not recite or suggest identifying a collimated region. Therefore, claim 11 is patentable.

Claims 3-10, 12 and 15-27 ultimately depend from one of independent claims 1 and 11, and are patentable over Ergun for the reasons given above.

Applicant respectfully requests that the Examiner withdraw the Non-Final Office Action mailed on February 10, 2003, as Ergun is does not recite or suggest Applicant's invention.

It is respectfully submitted that the pending claims define allowable subject matter. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Please charge any additional fees or credit overpayment to the Deposit Account of McAndrews, Held & Malloy, Ltd., Account No. 13-0017.

Respectfully submitted,
McANDREWS, HELD & MALLOY, LTD.

Date: April 9, 2003

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